

REMARKS

An excess claim fee payment letter is submitted herewith for three (3) additional independent claims.

Claims 1-16 are all the claims presently pending in the application. Claims 1-7 are amended to more clearly define the invention and claims 8-16 are added. Claims 1 and 4-8 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Applicant further notes that the Office Action incorrectly states that claims 1-5 are pending when claims 1-7 were pending as of the date of the Office Action.

Claims 1-5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Iwasaki et al. reference.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention, as recited by, for example, independent claim 1, is directed to an electric power steering device for transmitting rotation of a steering assisting electric motor to a steering mechanism through a small gear and a large gear.

The device includes a first member on a rotary shaft of said electric motor, a second member at one end of the small gear, and an elastic member between the first and second members for transmitting a torque between the two members. The elastic member has a first elastic modulus corresponding to a case, in which a torsion angle between the first and second members is less than a predetermined angle, and a second elastic modulus corresponding to another case, in which the torsion angle is one of equal to and larger than the predetermined angle. The first elastic modulus is smaller than the second elastic modulus.

A second exemplary embodiment of the claimed invention, as recited by, for example, independent claim 8, is directed to an electric power steering device that includes a first member, a second member, and an elastic member interposed between the first member and the second member. The elastic member has at least a two-stage torsional elastic modulus.

Conventional power steering devices do not operate a steering assist motor under low torque loads. Therefore, under these low torque loads, the steering assist motor acts as a torsional drag element which deteriorates the feel of the steering.

An exemplary embodiment of the claimed invention overcomes this problem by providing an elastic member that has a first elastic modulus and a second elastic modulus. In other words, the claimed invention provides an elastic member with a two-stage elastic modulus. In this manner, the steering feeling during low torque such as during small steering angle inputs, is significantly improved (page 3, lines 9-14).

II. THE 35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

The Examiner alleges that claims 1-5 are indefinite. While Applicant submits that such would be clear to one of ordinary skill in the art taking the present Application as a

whole, to speed prosecution claims 1-7 have been amended in accordance with Examiner Lum Vannucci's very helpful suggestions.

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

III. THE PRIOR ART REJECTION

The Examiner alleges that the Iwasaki et al. reference teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by the Iwasaki et al. reference.

The Iwasaki et al. reference does not teach or suggest the features of the present invention including: 1) an elastic member that has a first elastic modulus which corresponds to a torsion angle between the first and second members that is less than a predetermined angle, and a second elastic modulus which corresponds to a torsion angle that is not less than the predetermined angle, and wherein the first elastic modulus is smaller than the second elastic modulus. (Claims 1, and 4-8); and 2) an elastic member that has a two-stage torsional elastic modulus (claim 8). As explained above, these features are important for improving a steering feeling during low torque such as during small steering angle inputs.

Rather, and in stark contrast, the Iwasaki et al. reference discloses an electric power steering apparatus that includes bearings 42 and 43 connected to a drive shaft 40 such that the drive shaft 40 may move in an axial direction.

In particular, the Iwasaki et al. reference discloses a bearing 43 that includes an annular holding device 43D that holds a plurality of transfer bodies 43C. "The holding device 43D is constituted by a band-like elastic body 73 such as a rubber, spring material or

the like which elastically deforms in a direction of a width of the band plate as shown in FIG. 5.” (Col. 4, lines 26-30).

“Accordingly, the bearing 43 is connected to the drive shaft 40 in the axial direction, and elastically deforms the elastic body 73 (the holding device 43D) in the direction of the width of the band plate so as to move the adjacent transfer bodies 43C in one line in the peripheral direction. Therefore, making is possible to move the drive shaft 40 in the axial direction, at a time of inputting the load.” (Col. 4, lines 41-48).

In other words, the Iwasaki et al. reference discloses bearings 42 and 43 which elastically deform in an axial direction.

Therefore, contrary to the Examiner’s allegations, the bearings 42 and 43 that are disclosed by the Iwasaki et al. reference do not teach or suggest the features of the claimed invention including an elastic member having any torsional elastic modulus at all, let alone a first elastic modulus and a second elastic module, or a two-stage torsional elastic modulus.

Rather, the Iwasaki et al. reference discloses bearings 42 and 43 that only have an axial elastic modulus.

Further, and in even starker contrast, the bearings 42 and 43 operated based upon a completely different and unrelated principle of operation than the elastic member of the present invention. The elastic member of the present invention operates to couple two rotary shafts together. The elastic member of the present invention operates to couple these shafts together such that a torque is transferred through the elastic member.

In stark contrast, the bearings 42 and 43 that are disclosed by the Iwasaki et al. reference do not couple any shafts together at all. Rather, the bearings 42 and 43 operate to torsionally isolate the drive shaft 40 from the third gear housing 11C. Thus, the bearings 42

and 43 clearly do not operate to transfer any torque at all, let alone to transfer a torque between shafts through the bearings 42 and 43.

Therefore, the Iwasaki et al. reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw this rejection of claims 1-5.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-16, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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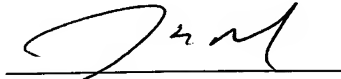
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: _____

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